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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/594,886

09/29/2006

Hideki Soya

SUT-0307

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07/16/2009

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EXAMINER

WILLIAMS, DON J

ART UNIT

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2878

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/594,886	Applicant(s) SOYA, HIDEKI	
	Examiner DON WILLIAMS	Art Unit 2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 April 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09/29/2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 10-12, 14-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Sakaino et al (5,304,803).

As to claims 10, 14, Sakino et al disclose (fig. 9a prior art) a light receiver (1A) for receiving light (15) by converting incident light (15) into electric signals (electrical charges), a readout unit (7) for reading the electric signals (electrical charges) acquired from the light receiver (1A), and a plurality of storage units (4, 4x to 4z) for storing electric signals (electrical charges) read by the readout unit (7), characterized in that said light receiver (1A), said readout unit (7) and said plurality of storage units (4, 4x to 4z) are arranged in series and a first drain structure (10) is disposed adjacent to a storage unit (4, 4x to 4z) corresponding to the readout unit (7) or readout unit (7), said first drain structure (10) for discharging excess part of the electric signals (electrical signals) read by said readout unit (7), (column 1, lines 60-68, column 2, lines 1-25).

As to claims 11, 15, Sakino et al disclose (fig. 9a prior art) sensor (1A) further includes a second drain structure (14) disposed adjacent the light receiver (1A) for discharging excess part of said electric signals (electrical charges) in said light receiver (1A), (column 2, lines 1-3, lines 18-19).

As to claim 12, Sakaino et al disclose (fig. 9a prior art) that light receiver is a photodiode, (1A), (column 2, lines 1-3).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakashiba (5,747,788) set forth as Nakashiba 1st in view of Nakashiba (5,589,698) set forth as Nakashiba 2nd.

As to claims 1, 6, Nakashiba 1st discloses (fig. 4) a light receiver (101) for receiving light by converting incident light into electric signals (signal charges), and a readout unit (102) for reading the electric signals (signal charges) acquired from the light receiver (101), (column 4, lines 12-17). Nakashiba 1st is silent of explicitly disclosing a potential gradient is provided in which potentials about the electric signals gradually change from the light receiver toward said readout unit. Nakashiba 2nd discloses that (fig. 2B) a gradually increasing channel width from W_{v1} to W_{v2} , generates corresponding gradient potentials from $\Phi V1$ to $\Phi V2$. The result is a gradually moderating narrow channel effect and a corresponding gradual increase in the electrical potential towards the first region (111) of the channel region of the horizontal charge transfer section. The maximum potential corresponds to that generated by the full width

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W_H of the horizontal charge transfer section. The result is the formation of a gradually increasing gradient potential, and the stronger fringe electrical field is generated towards regions (111), (column 7, lines 57-65). It would have been obvious to one of ordinary skill in the art to modify Nakashiba 1st in view of Nakashiba 2nd to generate potential gradients by gradually changing the electric potentials from the light receiver to the readout unit in order to improve the charge transfer time in the signal charge transfer process.

As to claims 4, 5, Nakashiba 1st discloses (fig. 4) photoelectric conversion section (101) which constitutes a photodiode and a photogate, (column 4, lines 6-15).

Claims 2-3 & 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakashiba (5,747,788) set forth as Nakashiba 1st in view of Nakashiba (5,589,698) set forth as Nakashiba 2nd and further in view of Miura (5,379,067).

As to claims 2, 3, 7, 8, Nakashiba 1st discloses (fig. 4) that the photoelectric conversion section (101) stores signal charges corresponding to the quantity of the incident light, the vertical charge transfer section (102) reads the signal charges in the photoelectric conversion section (101) and transfers them to the horizontal charge transfer section (103), and the horizontal transfer section (103) transfers to the output section (104) the signal charge received from the vertical charge transfer section (102). a light receiver (101) for receiving light by converting incident light into electric signals (signal charges), and a readout unit (102) for reading the electric signals (signal charges) acquired from the light receiver (101), (column 4, lines 12-17). Nakashiba 1st in

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view of Nakashiba 2nd is silent of explicitly disclosing potential gradient is provided by gradually enlarging a width of impurities or increasing the density of impurities to form said light receiver, from light receiver to said readout unit. Miura discloses (fig. 3) impurity diffused region (11) act to continuously widen the width (D) of the N-type photosensitive portions (1a, 1b) toward the readout gate electrode (2a, 2b). As shown in (fig. 5), therefore, the potentials of the photosensitive portions (1a, 1b) can be sloped down toward the readout gate electrodes (2a, 2b) by this impurity diffused regions (11). This potential gradient can increase the transfer efficiency of the signal charges (e), and prevent part of the charges from remaining within the photosensitive portions (1a, 1b), (column 3, lines 48-57). It would have been obvious to one of ordinary skill in the art to modify Nakashiba 1st in view of Nakashiba 2nd and further in view of Miura to gradually widen the width of impurities or increase the density of the impurities to form a larger area of the photosensitive or light receiver element from the light receiver to the readout unit in order to improve the transfer efficiency of the potential gradients resulting in a faster transfer time.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakashiba (5,747,788) set forth as Nakashiba 1st in view of Nakashiba (5,589,698) set forth as Nakashiba 2nd further in view of Mutoh et al (US2003/0089908).

As to claim 9, Nakashiba 1st discloses a solid state image sensor comprising a photoelectric conversion section (101) to define a light receiver, (column 4, lines 12-15). Nakashiba 1st in view of Nakashiba 2nd is silent of explicitly disclosing a crystalline lens

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for taking in the optical images of said photographic subject. Mutoh et al disclose (fig. 1) an image capturing apparatus that takes in optical images of a photographic subject (object) with the light receiver (31) converting the taken-in optical image into electric signals and has a crystalline lens (21) for taking in the optical images of the photographic subject (object), (paragraph [0057]). It would have been obvious to one of ordinary skill in the art to modify Nakashiba 1st in view of Nakashiba 2nd and further in view of Mutoh et al to use an image capturing apparatus comprise of a crystalline lens that is used to focus the optical image of the photographic subject onto the light receiver and converting the optical images into electrical signals resulting in acquiring a clear and precise image of the object.

Claim 13 rejected under 35 U.S.C. 103(a) as being unpatentable over Sakaino et al (5,304,803).

As to claim 13, Sakaino et al disclose (fig. 9a prior art) that light receiver is a photodiode (1A), (column 2, lines 1-3). Sakaino et al is silent of explicitly disclosing a photogate. Photogates, photodiodes, photosensors, photodetectors, phototransistors, and phototransducers are well known in the art for being used optical elements or light receivers that produce optical signals or photocurrents due to the incident of light or radiation or illumination. It would have been obvious to one of ordinary skill in the art to modify Sakaino to use the photogate as a light receiver in order to convert light into electric or charge signals at a fast rate resulting in improving the readout time of the charge signals.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sakino et al (5,304,803) in view of Mutoh et al (2003/0089908).

As to claim 16, Sakino et al disclose (fig. 9a prior art) light receiver (1A), (column 2, lines 1-4). Sakino is silent of explicitly disclosing a photographic subject and a crystalline lens for taking in the optical images of said photographic subject. Mutoh et al disclose (fig. 1) an image capturing apparatus that takes in optical images of a photographic subject (object) with the light receiver (31) converting the taken-in optical image into electric signals and has a crystalline lens (21) for taking in the optical images of the photographic subject (object), (paragraph [0057]). It would have been obvious to one of ordinary skill in the art to modify Sakino et al in view of Mutoh et al to use an image capturing apparatus comprise of a crystalline lens that is used to focus the optical signal of the photographic subject onto the light receiver and converting the optical signal into electrical signals resulting in acquiring a clear and precise images of the object.

Response to Arguments

Applicant's arguments with respect to claims 1-16 have been considered but are moot in view of the new ground(s) of rejection. The amendment as set forth in claims 10 & 14 by the applicant has overcome the U.S.C. 112 Rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DON WILLIAMS whose telephone number is (571)272-8538. The examiner can normally be reached on 8:30a.m. to 5:30p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 571-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Don Williams/
Examiner, Art Unit 2878

/Georgia Y Epps/
Supervisory Patent Examiner, Art
Unit 2878